

# Profiles

## European legislation (revised LCPD and EU ETS) and coal

'The *revised* LCPD mandates the installation of FGD and SCR on all plants'

Coal-fired power station operators in the European Union (EU) Member States have to comply with a myriad of environmental legislation. Among these are the *revised* (2001) Large Combustion Plants Directive (LCPD) and the EU Emissions Trading Scheme (ETS).

### Large Combustion Plants Directive (LCPD)

The *revised* LCPD set new emission limit values (ELVs) for sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO & NO<sub>2</sub>) (NO<sub>x</sub>) as well as emissions of particulate matter, fine and coarse, for all new power plants with a thermal capacity >50 MWth. The *revised* requirements for existing plants (those >50 MWth and licensed before 1 July 1987) apply from 1 January 2008. There are many options to comply with the *revised* LCPD including applying the new plant ELVs for SO<sub>2</sub>, NO<sub>x</sub> and particulate matter (also known as opting-in). This would of course entail the installation of control technology. Another option for existing facilities is to operate within a National Emission Reduction Plan (NERP) which sets an annual national level of emissions calculated by applying the ELV approach to existing plants, on the basis of those plants' average actual operating hours, fuel used and thermal input. Other options include switching to low sulphur fuels, reducing output (by choosing to opt out of the LCPD and operate no more than 20,000 hours between 1 January 2008 and 31 December 2016) or, shutting the plant down altogether as a final option.

'The *revised* LCPD and EU ETS increase the cost of coal-based electricity'

The *revised* LCPD will have major implications on the demand for steam coal in the EU and will result in changing the role of coal-fired plants over the next decade and beyond. The requirements of the *revised* LCPD for existing facilities mean that by 2016, all major pulverised coal fired power plants will have to install FGD (for >90% removal of SO<sub>2</sub>) and SCR (for >85% NO<sub>x</sub> removal). At estimated investment costs of between 100 and 150 €/kW each, these retrofit costs cannot be ignored. At a combined cost of approximately 250 €/kW to fully equip an existing facility to new power plant standards, an existing power station would need to see an increase in revenues of at least 37.5 €/kW/y to recover the additional investment cost alone. This translates to an increase in all-costs of 5.0 €/MWh for a base-load coal-fired facility or an increase of 8.6 €/MWh if the plant were dispatched at only 50%. The *revised* LCPD is thus obviously a key factor driving the current environmental equipment market in the EU.

### EU Emissions Trading Scheme (ETS)

In addition to the *revised* LCPD requirements, all coal-fired combustion facilities with a capacity >20 MWth have to take part in the EU ETS. The EU-ETS is a cap and trade scheme which began on 1 January 2005 with Phase I from 2005-07 and a Phase II from 1 January 2008 to 31 December 2012. Phase II coincides with the first Kyoto Protocol commitment period. The Kyoto protocol entered into force

'Maintaining the coal-option provides EU Member States with a key strategic choice'

on 16 Feb 2005 following the Russian ratification in November 2004. Current number of the Kyoto protocol parties is 165, as of September 2006. The EU ETS is expected to continue after 2012 in 5-year phases. Phase I of the scheme covered emissions of only CO<sub>2</sub> but individual Member States will be able to incorporate other greenhouse gases from 2008 in Phase II. The amount of CO<sub>2</sub> emitted from fossil-fuel energy sources is given as about 430 g/kWh for gas, 830 for oil and 960 (the highest) for coal. Under the EU-ETS, the 25 Member States are able to buy and sell permits/allowances to emit CO<sub>2</sub> covering about 40% of the EU's total CO<sub>2</sub> emissions. The EU ETS excludes key economic sectors such as the large and fast-growing transport, household and services sectors.

The number of EU allowances (EUAs) received by each company or installation were based on each Member State National Allocation Plan (NAP). The NAP is based on objective and transparent criteria that stipulates the total quantity of allowances that the Member State intends to allocate for that period and how it proposes to allocate them. The EU ETS Directive required each Member State government to submit to the European Commission its NAP by 31 March 2004 for Phase I and 30 June 2006 for Phase II. In Phase I of the Directive, >95% of the allowances were allocated to installations free of charge. Individual governments decided whether up to 5% of the allowances were auctioned. At the time, 14,000-plus installations were

expected to fall within the scheme. In fact, the scheme encompassed around 11,500 large industrial plants. Phase I EUAs cannot be carried over into Phase II and will be of no value on 1 May 2008. In Phase II of the scheme the emphasis is on ensuring high standards across Europe (in monitoring, reporting and verification and enforcement of sanctions) as well as the inclusion of aviation emissions and linking of the Kyoto mechanisms and other schemes.

Incorporating the cost of carbon, with the EU ETS, into the power industry cost structure impacts the choice of fuel to generate electricity. The price of electricity, as well as fuel, rose sharply in 2005 and 2006 and is expected to continue rising in the long-term in order to incorporate the price of carbon. A greater shift towards firing natural gas is envisaged, although this is somewhat mitigated by the transmission capacity. The **energy mix** (coal-gas-oil spread) and **security of supply** considerations for each and every Member States have become paramount. Some Member States have been reconsidering the utilisation of nuclear power to generate CO<sub>2</sub>-free electricity in the long term. In the shorter term, the combined impact of the EU ETS and the *revised* LCPD is a key factor, which must be considered, that is creating uncertainties with regard to the future life of fossil-fuel based, especially coal-fired, power stations.

### What this means for coal

There are currently few plans to build new coal-fired power plants in the EU. However, existing coal-fired plant modernisation can have enormous implications as far as the world's resources and climate are concerned. Over the course of the last thirty years modern coal-fired power stations have increased their specific power yield by about one third with further untapped potential still remaining. Also, coal-fired power generation technology has now been developed that can guarantee 40–45% (LHV) efficiency along with greater plant availability. Hence, if all (worldwide) coal-fired power plant that are more than thirty years old were refurbished over the next two decades it would be possible to reduce global CO<sub>2</sub> emissions by something in excess of one billion tonnes a year.

The resulting energy savings and environmental emissions of a refurbishment programme would be sufficient to meet the Kyoto objectives of every industrialised nation.

IEA Clean Coal Centre is a collaborative project of member countries of the International Energy Agency (IEA) to provide information about and analysis of coal technology, supply and use.

IEA Clean Coal Centre has contracting parties and sponsors from: Australia, Austria, Brazil, Canada, China, Denmark, the European Commission, Germany India, Italy, Japan, Republic of South Korea, the Netherlands, New Zealand, Russia, South Africa, Sweden, Spain, the UK and the USA.

Each issue of *Profiles* is based on a detailed study undertaken by IEA Clean Coal Centre, the full report of which is available separately. This particular issue of *Profiles* is based on the report:

**European legislation (revised LCPD and EU ETS) and coal**  
Herminé Nalbandian  
CCC/121, ISBN 92-9029-439-6,  
68 pp, March 2007,  
£255\*/£85†/£42.50‡

\* non-member countries  
† member countries  
‡ educational establishments within member countries



Gemini House  
10-18 Putney Hill  
London SW15 6AA  
United Kingdom

Tel: +44 (0)20 8780 2111

Fax: +44 (0)20 8780 1746

e-mail: [mail@iea-coal.org.uk](mailto:mail@iea-coal.org.uk)

> Internet: [www.iea-coal.org.uk](http://www.iea-coal.org.uk)